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Case Report

Pregnancy with asymptomatic uterine complete rupture after uterine artery embolization for postpartum hemorrhage



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ABSTRACT

Objective: Uterine artery embolization has become an effective treatment for postpartum hemorrhage. The safety of pregnancy after uterine artery embolization for postpartum hemorrhage has been established.

Case report: We present the case of a pregnant woman with asymptomatic uterine complete rupture who underwent uterine artery embolization for a previous placenta previa. She had not been diagnosed with uterine rupture until cesarean section was performed, and fortunately, we obtained the best maternal and neonatal outcomes.

Conclusion: Many studies have been reported that uterine artery embolization for postpartum hemorrhage did not affect subsequent pregnancy outcomes. However, we report that this procedure contains a potential risk for asymptomatic uterine rupture in a subsequent pregnancy. Although it is difficult to diagnose uterine rupture without symptoms, the obstetrician should be aware of the possibility of uterine rupture.

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Introduction

In recent years, uterine artery embolization (UAE) has become a commonly performed procedure for serious postpartum hemorrhage (PPH) [1]. Many studies reported about no long-term adverse effect on fertility outcomes after the procedure [2–10]. Although cases of symptomatic uterine rupture in subsequent pregnancies after UAE for fibroids and cervical ectopy have been reported, there have been no report about uterine rupture in subsequent pregnancies after UAE for PPH [11,12]. We present a case of pregnancy with asymptomatic uterine complete rupture after UAE for PPH with placenta previa.

Case report

A 30-year-old woman, gravida two para one, underwent cesarean section because of placenta previa from a previous pregnancy.

Before the previous cesarean delivery, magnetic resonance imaging showed that the placenta was located on the lower anterior segment of the uterus; therefore, a classic cesarean section was performed. A 3065 g male fetus was delivered with Apgar scores of 8 and 9 at 1 and 5 min, respectively. Her placenta was removed spontaneously followed by uncontrollable massive hemorrhage. Consequently, she underwent UAE using gelatin sponge particles; she did not require further treatment and was discharged on postoperative day 7.

Thirty-one months after the UAE, the patient conceived naturally. She was diagnosed with placenta previa on vaginal sonography at 28 weeks of gestation and magnetic resonance imaging at 32 weeks of gestation. She underwent an elective cesarean section at 37 weeks of gestation. A male fetus with Apgar scores of 8 and 9 at 1 and 5 min, respectively, was delivered by a transverse incision on the lower segment of the uterus. The placenta was delivered smoothly, and a Bakri balloon was left inside the uterine cavity to control any continued bleeding.

Intraoperatively, uterine rupture was detected on the uterine fundus at the center of the previous cesarean scar, which measured about 2 cm. It was surrounded by white granulation tissue, and the membrane was prolapsed from the perforation (Fig. 1). The scar was trimmed and closed. The total volume of hemorrhage was

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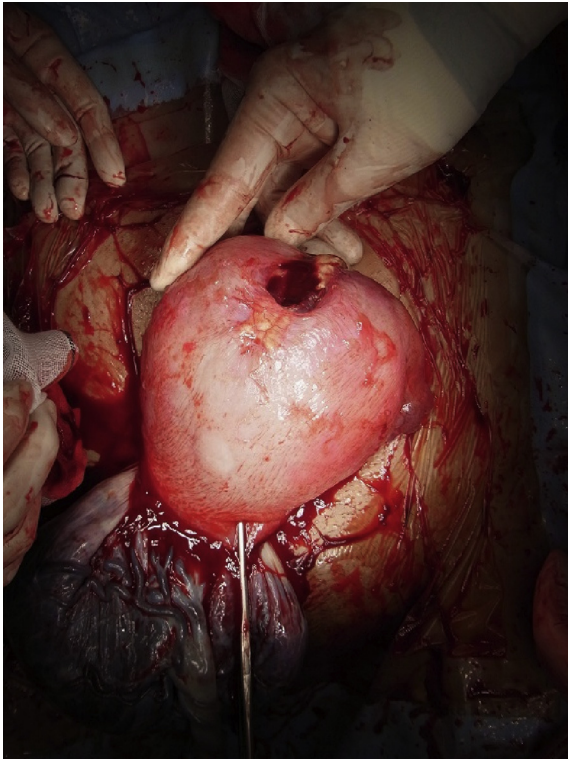


Fig. 1. Uterine rupture on the fundus of the uterus (at the scar of the previous cesarean delivery).

1479 g, including the amniotic fluid. Blood transfusion was not needed.

Pathologically, the uterine rupture contained calcified and fibrosed old focal eosinophilic necrotic components. In addition, the scar tissue of the uterine myometrium included the endometrium and decidua, but not the villi and placental tissues.

After this delivery, we re-evaluated the magnetic resonance images taken before the surgery, and found a minor rupture and a bulging membrane at the uterine fundus (Fig. 2). Thus, the rupture had already formed by 32 weeks of gestation.

On postoperative day 1, we removed the Bakri balloon, and the patient was discharged on postoperative day 7 with her baby. At 1 month after surgery, vaginal ultrasonography did not show any abnormal changes in her uterus.

Discussion

UAE is often performed for obstetrical and gynecological diseases [1]. According to the Ontario Multicenter Trial study, which investigated pregnancies after UAE for leiomyomata, among the 24 pregnancies that were identified after embolization, four (16.7%) had spontaneous abortions and three (12.5%) developed abnormal placentation [13]. In addition, uterine rupture in pregnant women after uterine artery embolization for fibroids and cervical ectopic pregnancy has been reported [11,12].

UAE procedures for fibroids and PPH are different, because UAE for fibroids uses very small particles that induce definitive occlusion of very distal arteries, avoiding the development of collaterals [3]. Therefore, some studies reported that the consecutive irreversible ischemia could occur in the uterus after UAE for fibroids [3,8]. In contrast, the particles generally used for PPH embolization

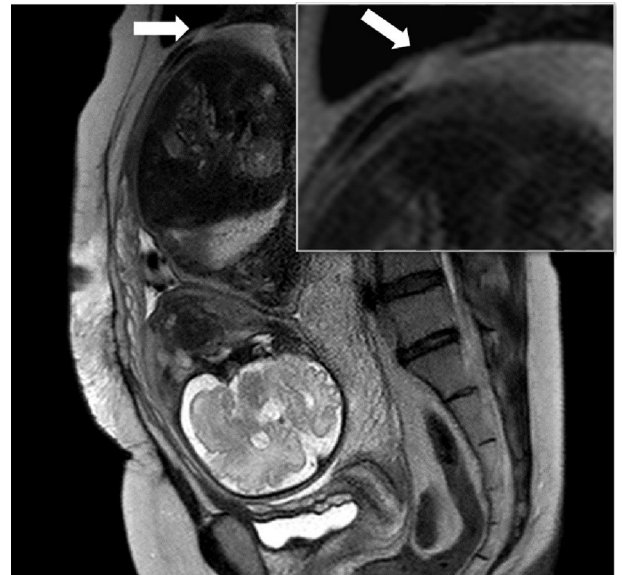


Fig. 2. Magnetic resonance imaging (T2-weighted imaging) showed the rupture (arrow).

are absorbable materials [8]. Considering this fact, we reviewed the literature about the subsequent pregnancy outcomes after UAE for PPH (Table 1) [2–10]. Of 94 subsequent pregnancies after UAE for PPH, one case (1%) developed a pregnancy induced hypertension, and one case (1%) presented with a gestational diabetes mellitus. Recurrent PPH occurred in seven cases (7.4%). Among these cases, two cases needed hysterectomies because of the placenta accreta. Although miscarriages were identified in 14 cases (14.8%), except for the cases of miscarriage, almost all the cases delivered the healthy babies.

In this case, the patient had undergone a previous classic cesarean section, and uterine rupture was detected along the scar of previous cesarean section. From the anatomical perspective, because 90% of the blood supply to the uterine fundus is derived from the uterine artery [1], the rupture might have occurred after ischemia and necrosis of the myometrium. Therefore, we hypothesized that a longitudinal uterine incision might be a higher risk factor for uterine rupture after embolization than a transverse incision of the lower part of uterus, based on the blood flow distribution.

According to a previous study on 19 non-pregnant women with uterine necrosis after UAE for PPH, the mean time interval between embolization and the diagnosis of uterine necrosis was 21 days [14]. However, abnormal changes were not detected on uterine fundus by sonography not only before the subsequent pregnancy but also first and second trimester of pregnancy. Of course, vulnerable changes like dehiscence which we could not detect might have happened on the previous cesarean scar. Finally, we diagnosed this rupture as complete rupture, because all layers of the uterine wall were separated [15].

We could not diagnose this uterine rupture before cesarean delivery. Uterine rupture is a rare obstetric emergency and asymptomatic patterns are difficult to diagnose. Obstetricians should evaluate the myometrium carefully (i.e., using ultrasonography and magnetic resonance imaging) regardless of symptoms, throughout the entire gestational period of subsequent pregnancies.

Table 1

The review of subsequent pregnancy outcomes after UAE for PPH.

Reference	No. of patients	No. of pregnancy	Maternal age (average)	Indication for UAE	Pregnancy outcomes	Complications	Mode of delivery
Chauleur et al. [2]	15	18	Unknown	Unknown	FD (n = 16) PD (n = 1) Miscarriage (n = 1)	PIH (n = 1) GDM (n = 1) Twin pregnancy (n = 2)	VD (n = 8) CS (n = 7)
Fiori et al. [3]	13	20	Unknown	Unknown	FD (n = 11) PD (n = 1) Miscarriage (n = 3) Ectopic pregnancy (n = 1) Elective abortion (n = 4)	PPH (n = 1)	VD (n = 12)
Hardeman et al. [4]	12	14	Unknown	Atony (n = 11) Thrombus (n = 1)	FD (n = 12) Elective abortion (n = 2)	PPH (n = 2) Congenital malformation (n = 1)	VD (n = 8) CS (n = 4)
Ornan et al. [5]	8	10	26.9 (range, 20–34)	Placenta accreta (n = 2) Vaginal laceration (n = 2) Coagulopathy (n = 1) PIH (n = 2) Unknown (n = 1)	FD (n = 6) Miscarriage (n = 2) Elective abortion (n = 2)	No complications	VD (n = 4) CS (n = 2)
Shim et al. [6]	9	9	Unknown	Unknown	FD (n = 6) Miscarriage (n = 3)	No complications	Unknown
Descargues et al. [7]	7	10	Unknown	Unknown	FD (n = 6) Miscarriage (n = 3) Elective abortion (n = 1)	No complications	VD (n = 3) CS (n = 3)
Salomon et al. [8]	5	6	34.8 (range, 34–36)	Atony (n = 4) Placenta accreta (n = 1)	FD (n = 4) Miscarriage (n = 2)	PPH (n = 4)	Unknown
Eriksson et al. [9]	4	5	Unknown	Unknown	FD (n = 5)	No complications	CS (n = 5)
Wang et al. [10]	1	1	30	Atony	FD	No complications	CS
This case	1	1	30	Placenta previa	FD	Uterine rupture	CS

CS = cesarean section. FD = full term delivery. GDM = gestational diabetes mellitus. PD = preterm delivery. PIH = pregnancy induced hypertension. PPH = postpartum hemorrhage. UAE = uterine artery embolization. VD = vaginal delivery.

Patient consent

Written informed consent was obtained from the patient for publication of this case report. This study was approved by the Institutional Review Board of the National Defense Medical College.

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Conflicts of interest statement

The authors have no conflicts of interest relevant to this article.

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